

Glen Canyon Adaptive Management Work Group (AMWG)
Minutes of January 20-21, 2000 Meeting
Phoenix, Arizona

FINAL

Presiding: Stephen Magnussen, USBR (Chairperson)

Recorder: Linda Whetton, BOR

1/20/00: Convened: 9:30 a.m. **Adjourned:** 4:00 p.m.

Welcome and Introductions

Stephen Magnussen introduced himself as the Secretary's Designee and Chairman of the AMWG. He welcomed the members, alternates, and visitors to the meeting and stated the meeting will focus on the goals associated with the Mission and Vision Statement.

Roll Call. With a quorum established, attendance sheets were distributed. ([Attachment 1](#)- Sign-In Sheet for AMWG Members/Alternates/Public)

Administrative Items :

1. **MOTION:** Approval of Meeting Minutes for Oct. 21, 1999. One correction noted (change AGlen@ to AGrand@Canyon on page 6, goal 20). Linda Whetton will make the correction. Motion second and passed.
2. Barry Gold has been selected as the new chief of the GCMRC.
3. Rob Arnberger announced that Dr. Bob Winfree had received an award from the NPS for the many hours he has worked in completing assignments and for his efforts in gaining more media coverage of the AMP. Rob also distributed copies of a newsletter on Grand Canyon activities along with a newspaper published by the NPS which included an article on the AMWG and other articles on nature, the river corridor, and archaeological sites. He and others are working to get the word out on this committee.

AMWG Strategic Plan Ad Hoc Committee Report - Mary Orton said the Strategic Ad Hoc Committee (Kerry Christensen, Wayne Cook, Amy Heuslein, Rick Johnson, Andre Potochnik, Ted Rampton, and Mindy Schlimgen-Wilson) has used the mission and vision statement developed by the AMWG to develop principles and goals. They are seeking interim approval of the goals with the intent of having a thorough discussion at the AMWG meeting in April. Mary referred the members to her cover memo dated January 5 ([Attachment 2a](#)), the AReport to AMWG, January 2000, Principles and Goals@ ([Attachment 2b](#)), and the "Report to AMWG, January 2000: Principles and Goals, With Comments and Responses" ([Attachment 2c](#)). The following comments were made:

Category A: Riverine Ecosystem. Goal 2: need clarification on Aremove jeopardy.@ Is it a term from the law or a grammatical reference to removing jeopardy from all fish?

Category B: Riparian Ecosystem. No comments

Category C: Socio-cultural Resources: Goal 12: concern with not including the word **Apast**.@ A group will meet and provide new language.

Category D: Administration: The word **Arevenue**@ has a particular meaning. Replace with **Afunding based**.@

Concerns Raised (Flip Chart Notes)

- Goal 2 - Is **Aremove jeopardy**@ legal term of art?
- Goal 12 - Needs revision: include words such as **Apast**@
- Downstream recommendations
- Goal 15 - Change **Arevenue**@ to **Afunding based**@
- In Glossary - Definition of RPA and removal of jeopardy - change last sentence

In addition to the above, it was felt that a definition of the TCP needed to be included in the document. Clay Bravo also suggested adding another goal to Administration to read **Aincrease opportunities for Indian tribes in the Glen Canyon Dam Adaptive Management Program**.@

Action: Clay will provide suggested language for the goals document.

Peter Evans expressed concern that there were almost no references to maintaining western water supply.

Action: Peter will meet with the other state representatives and return after lunch with a motion.

Mary said there were some socio-economic issues in the Downstream Report and in the EIS which were not addressed in the goals.

MOTION: The Ad Hoc Committee for Strategic Planning recommends to the AMWG that it direct the Ad Hoc Committee on the NRC Report **ADownstream**@ to address the socio-economic concerns expressed in **ADownstream**.@

Stephen advised the above motion be deferred until Barry Gold reports on the Downstream Ad Hoc Committee.

Without objection, the motion was withdrawn.

MOTION: The Ad Hoc Committee for Strategic Planning recommends to the AMWG that the Ad Hoc Committee on Strategic Planning be charged by AMWG to do the following:

- a. produce the first draft of MOs for the TWG
- b. obtain comments on that draft from the TWG
- c. incorporate TWG comments into a second draft and revise Goals and Objectives as necessary.

- d. meet with the TWG to review revised Goals and MOs and responses to comments, and make any further needed revisions, and
- e. Present the MOs to the AMWG spring meeting for approval.

Motion carried.

Follow up - Items from Morning Session

Socio-cultural - Peter said in reading through the document there are lots of indications that construction of the dam changed the ecosystem, etc. He drafted a potential addition to the principles and asked the Ad hoc committee to give it some consideration:

AGCD and its operation provide regulation of the flow of the Colorado River and storage of water for beneficial consumptive use.

Goal 12 - Nancy Coulam said it is still being revised and will be ready for tomorrow's AMWG meeting.

Goal 16 - It was agreed to change the word ~~increase~~ to ~~enhance~~.

MOTION: Interim approval of the goals document as presented, with the exception of Goal 12, and the following changes:

- Goal 15 - the word ~~revenue~~ is changed to ~~funding~~
- Glossary, page 8, ~~Reasonable and Prudent Alternative~~ and ~~Reasonable and Prudent Measure~~: remove the word [Regional].
- Glossary, page 9, ~~Removal of Jeopardy~~ next to last line, replace ~~done~~ with ~~intended to be accomplished~~,

and that the ad hoc committee on Strategic Planning consider adding new language as follows:

- ~~Enhance~~ opportunities for Indian Tribes in the GCD AMP.
- GCD and its operation provide regulation of the flow of the Colorado River and storage of water for beneficial consumptive use.

Motion carried.

Budget Ad Hoc Group Meeting - Barry Gold reported on the progress of the last ad hoc committee. He had sent out the recommendations on what they are trying to accomplish in FY 2000 to put into a full cost accounting process ([Attachment 3](#)). These are the first two months of doing this and demonstrates how it is working. By the end of this year, they will be able to provide all the costs.

Bruce Taubert said his biggest concern is understanding how money is moved around and would like to have the table include expenditures as well as obligations.

Action: Barry will add an Expenditures column.

Concerns Raised (Flip Chart Notes)

- S add table or column identifying which goal or MO the project addresses
- S not an accounting report, title Budget obligated funds
- S add expenditures column to table 1

3-Year Budget Report – Randy presented the 3-Year Budget Report for the AMP Administrative Costs ([Attachment 4](#)). For FY 2000 the budget is \$470,000 and for FY 2001 it is \$443,000. He asked the members to review the document and direct any comments or questions to him.

Tribal Participation and Administrative Costs - Randy passed out two memos - one from John Berry dated Dec. 21, 1999, and the other from Mark Schaefer dated July 19, 1999 ([Attachment 5](#)). Both address the issue of tribal participation. The AMWG initiated discussion last spring to secure more funding for the TWG and passed a motion to seek tribal appropriations. Since that time, the Department has agreed to designate \$75,000 of appropriated funds, \$15,000 per agency. The 2001 budget has not been released but Reclamation is assuming the \$75,000 will stay the same. The five agencies involved (USGS, FWS, BIA, NPS, and BOR) were encouraged to seek individual appropriations to bridge the differences. Randy passed out copies of the Budget Work Plan ([Attachment 6](#)).

Concerns Raised (Flip Chart Notes)

- PA be fully funded by Federal agencies outside of the AMP

Tribal Trust Responsibilities - Scott Loveless provided a brief history of tribal trust responsibilities. Around 1820, Chief Justice Marshall characterized the relationship between the Federal Government and the Indian tribes as a guardian and its wards. The Supreme Court and other courts have re-characterized the relationship as one in which the Federal Government is the trustee and the tribes are the beneficiaries. One necessary element for a trust relationship is a corpus (an asset, a resource) that the trustee is taking care of on behalf of the beneficiary. Those resources could include tribal lands, tribal property rights, water rights, etc. In general terms, the

Secretary of the Interior, through the BIA, has responsibility to approve any action that would affect the corpus of the trust.

The courts speak in very broad terms of the trust responsibility but in practice it's fairly narrow. The actual trust responsibility is placed on the Executive Branch. The relationship is one of taking care of the resources on behalf of the tribes. When the Bureau of Reclamation conducts any activities, they have to take into account the effect on Indian trust assets, whether land, water, or cultural resources interests. Every situation, tribe, treaty, and statute are different.

Proposed Change in AMWG Operating Procedures - Stephen said an issue has come up in terms of alternates and their voting, etc. He read the following statement from the Operating Procedures:

Each AMWG member may designate an alternate to serve with the same term of the member. Alternates must be identified to the Chairperson in writing. If the alternate is to represent the member at any AMWG meeting, the member must so notify the chairman one and a half days prior to such meeting.

Prior to today's meeting, he received three letters in writing but noted there were a number of members being represented by alternates for which no letters had been received. In discussing this issue with some of the members, there was some question whether or not the day and a half notification is really necessary.

Motion: To modify the AMWG Operating Procedures to allow an officially designated alternate in absence of the member to fully participate and vote in the AMWG meeting without prior notification.

A discussion followed with a couple of concerns raised: 1) if a member sends someone other than the designated alternate, there is the potential for having too many alternates running the program and that wasn't the purpose of the charter, and 2) this issue requires more discussion. Without objection, the motion was withdrawn.

Action: This item will be placed on the agenda for the April 2000 meeting.

Final AMP Guidance Document - Stephen Magnussen passed out copies of a letter ([Attachment 7a](#)) to accompany the pre-meeting materials transmitting the Guidance Document ([Attachment 7b](#)) prepared by Scott Loveless. There was quite a bit of discussion by the members relative to ownership of resources and how the river corridor is defined. Scott reiterated that the resources are limited by the boundaries. He said there may be a need for additional guidance but this should serve as a beginning. The language is synonymous with the statute. Stephen thanked Scott for the work he has done and suggested that if there were additional comments, they should be put in writing and sent to Scott.

Raised Concerns (FLIP Chart Notes) -

- question about ANPS ownership of downstream resources. Use A within the boundaries of the NPS system.
- Hualapai do not agree with A downstream NPS resources page 2.
- there are different levels of jurisdiction - important to separate. This document does not detract from stakeholder responsibilities.
- river corridor not well enough defined.
- resources not affected by dam operation should be paid by non-AMP funds
- pursue States support of write-in funding for Interior agencies

Budget Discussion Resumed - Stephen questioned if there was going to be a motion to adopt the 2001 budget.

Motion: Adopt the 2001 budget.
Motion passed.

Downstream Ad Hoc Committee Report - Barry Gold said there were some minor changes made to the previous document so a new version will be mailed out on Monday, Jan. 24. The GCMRC developed a schedule to meet the target in the document that shows their proposed recommendations and findings and also includes a schedule and working with the Downstream Group to produce a final document. He proposed to meet with the ad hoc group meet during the week of March 6-10. There were concerns raised with the schedule and having sufficient time to review the NRC Report, whether the group could move forward with the goals, and if critical issues raised by Downstream Group could be incorporated into the goals.

Action: Charge the Downstream Ad Hoc Group to report back at the April meeting. Get a complete report by April 1, 2000.

Automatic Generation Control (AGC) - Barry said he received a request on January 11 from WAPA and a group of stakeholders to study the effects of automatic generation control on the Lees Ferry Reach. They propose to do four things:

1. Have WAPA and BOR work on set of analysis questions which they would get out for external peer review
2. They will work with USGS to analyze the historical data that exists from 1989-1993 when Glen Canyon Dam gage and the Lees Ferry gage were operating so they could see whether or not they can measure the exceedances that occur and how they might attenuate between those two gages.

3. Reinstall the GCD gage in FY 2000.
4. Get back together with the group that made the request so they can look at what else needs to be done to address the issue of automatic generation control.

GCMRC has some money in the FY 2000 budget that is used for other unforeseen requests and they are going to use those sources of funds to support these types of activities. They will probably ask the State of Arizona to request the USGS to reinstall the gage at GCD. If they do that, there may be some cost sharing funds available.

Barry distributed a complete set of the ~~A~~Development and Implementation of a Long-term Monitoring Plan for Fish in the Colorado River Ecosystem@ ([Attachment 8](#)) which will be discussed at tomorrow's meeting.

Public Comment

Pam asked that documents made available to the AMWG members prior to a meeting be available for the general public the day of the meeting.

Adjourned 4: p.m.

Glen Canyon Adaptive Management Work Group (AMWG)
Minutes of January 21, 2000 Meeting
Phoenix, Arizona

Presiding: Stephen Magnussen, USBR (Chairperson)

Recorder: Linda Whetton, BOR

1/20/00: Convened: 8:00 a.m. **Adjourned:** 11:30 a.m.

Welcome and Introductions

Randy Peterson said Stephen Magnussen was going to be delayed a few minutes so he welcomed the committee members, member alternates, and visitors to the meeting.

Roll Call. With a quorum established, attendance sheets were distributed.

Administration

With no changes to the agenda, Randy asked if there was any new business. Debra Bills (FWS) introduced Rob Simmons.

Follow up Items

Nancy Coulam reported that Goal 12 was rewritten and two management objectives were added ([Attachment 9](#)). The goal now reads:

ACultural resources within the river corridor shall be preserved, protected, managed, and treated for inspiration and benefit of past, present, and future generations.**@**

The group will be meeting on Feb. 3 at GCMRC at 10 a.m. so if people have comments or want to work on those goals, let the group know before then.

Andre said that in keeping with how the other goals have been written, this goal should begin with a verb.

MOTION: Move to tentatively approve goal 12.

Motion carried.

Report on Sediment Protocol Evaluation Panel - Ted Melis introduced Dr. Ellen Wohl from the Earth Resources Dept. at Colorado State University. She was the chairperson for the SEDS Protocol Evaluation Panel. The panel consisted of nine geomorphologists and one aquatic ecologist. They had two specific charges: 1) review the past and current protocols used, specifically the physical sciences monitoring program, and 2) evaluate other alternative protocols and technologies. A preliminary report was delivered at the end of September of 1998. They met a year later and were charged with: 1) reviewing the NRC 1999 report and offering suggestions with respect to critical resources and monitoring, 2) evaluating what had been done since 1998 with respect to new or continuing strategies or methods, and 3) assessing very specific recommendations. The physical scientists were also asked to make recommendations and offer comments on their own research programs. In addition, they made general comments in both reports on future directions or organizational strategies they thought were important for the program to pursue.

Their concluding recommendations emphasized the importance of developing a conceptual framework which would encompass all GCMRC science programs. They think the ecosystem model being developed is probably the best way to do that. They saw a need for clarifying the way the information needs are stated - it's part of that two step process where AMWG and TWG prepare the broader goals and then the scientists from each program determine precise information needs. They emphasized the importance of using a synoptic or snapshot picture of the riverbed as a basemap for identifying how to focus in on the detail study reaches. They wanted to emphasize that the 1 and 2 sediment modeling is critical to the sediment budget and they would like to see that continue. The collection of daily sediment samples along the main channel is also critical to the sediment budget and think that what's going on in terms of looking at tributary channel is very important and could be expanded to include some of the other tributary channels that could provide a fair amount of sediment to the main channel but there is no handle on that at this point in time. The panel was very happy with the way the physical resources program is being managed.

Basic Hydrologic Conditions

Likelihood of BHBF or Low Release Year - Rick Gold reported there are some fairly unique hydrologic conditions occurring based on current snowpack information. With 50-60% of normal snowpack range in the basin, Reclamation needs to do some planning under their operational responsibility for the dam. They wanted people to know that Reclamation has an opportunity to do some focused testing on low steady flows in the July-Aug-Sept time frame based on the current hydrology and on the requirements of the Biological Opinion.

Tom Ryan reported there are dry conditions in the basin as forecasted by the NWS as of Jan. 18, 2000. At present, the integrated snow water equivalent average for the Colorado River Basin is 60%. The January 1 forecast by the NWS was 52% of average, that was only 4 maf and there has

never been an April-July forecast issued in January that was that low. That's remarkable in terms of the impact it has on Reclamation's operation. The forecast received on Jan. 14 was increased to 4.5 maf which is 58% of average. He cautioned not to look at the January forecasts as being indicative of what the year will be and presented an overhead which showed some historic deviations from January forecasts.

Reclamation takes the NWS forecasts, inputs them into their operations models, and determines monthly releases ([Attachment 10a](#)). They ran three scenarios in January (page 2). When they put in the 4.5 maf mid-month January forecast ([Attachment 10b](#)), they come very close to being on the threshold of an 8.23 maf minimum objective release year at Glen Canyon.

Status of ESA Section 7 Compliance for FY 2000 - Dennis said there is a BA ready to go, however, it hasn't been sent to the FWS but has been informally discussed with them. We already have compliance on a March-April BHBF event and the baseline has not substantially changed from where it was last year. The BA has not been given to the FWS because the probability of a May, June, or July BHBF is so low and because they are turning more of their attention to the prospect of a LSSF.

People have asked that if the forecast changes and we get more water, how might we make releases. He showed a graph which displayed the increasing and decreasing inflows. The LSSF is one of the components of the RPA. The other component is high spring flows. As higher flows are released during March through May, they create a benefit for humpback chub by ponding at the mouth of the LCR. That was the type of hydrograph ([Attachment 11](#)) developed by a group of researchers under contract to the GCMRC for an annual flow scenario that might be created to satisfy the RPA, the element having to deal with a program of experimental low steady summer flows.

He said that we may have an opportunity of the hydrograph and conduct an abbreviated test. It's not the entire spectrum which is what is called for in the RPA but it is a test.

Concerns Raised (Flip Chart Notes)

- S question about role of each part of hydrograph
- S use same \$ to change monitoring as a result of low flows?
- S More information (flows) is needed to adjust monitoring planning
- S Planning should be done this year, even if opportunity diminishes
- S contingency funding as well as re-prioritization should be pursued
- S AMWG is an advisory body
- S Need for information to AMP groups (GCD update, website, consultation meetings)

Kanab Ambersnail Panel Report - Jeff Sorensen presented results and recommendations from the KAS Workshop ([Attachment 12](#)). He reviewed how the review panel was formed, their objectives, information that was given to them, and the recommendations they provided. He has solicited comments from those involved and once the KAWG has met and reviewed them, he could make another presentation to the TWG in March.

Formation of Native Fish Work Group (NFWG) - Dennis Kubly provided copies of the ~~A~~Native Fish Group: An Approach to Removal of Jeopardy from Native Fishes in the Grand Canyon® ([Attachment 13](#)). Reclamation and FWS are seeking to develop a native fish work group which will be comprised of a core of agency biologists and supplemented with academicians and consultants having the expertise needed to put together a program of management actions to remove jeopardy from native fish in the Grand Canyon. Once there is concurrence between physical scientists, lower trophic level scientists, and the native fish work group, the proposal would be sent to the TWG for review.

They anticipate the final plan will be completed by May 2001. However, given the recent changes in hydrology and the possibility of a LSSF, they may need to put the plan on hold and concentrate on the urgency that is being created by current hydrology.

Temperature Control Device Workshop

TCD Workshop Summary - Dennis Kubly reported that Reclamation had issued a Draft EA on the construction of the TCD in January 1999 and as a result of feedback received, they agreed to a reissuance of that document which would include a research and monitoring plan identifying the effects of the action. The workshop served as a forum for input from scientists, resource managers, and conservationists on the plan being developed by the GCMRC to assess the effects of the TCD.

The summary is in draft and should be ready this week. One of the things that won't be seen in the summary is an agreement by all parties. There were some recommendations included in the report as well as some questions to try and get a feeling for people's views.

Preparation of TCD Monitoring Plan and Native Fish Long Term Monitoring Plan - Barbara Ralston asked for comments from the memo passed out yesterday.

Concerns Raised (Flip Chart Notes):

- S too little, too late, too few options
- S How do we go from this phase to long-term monitoring?
- S Response: by 2002 we will have fish monitoring as well as for aquatic food base
- S This is a good first step and get on with it.

- S If you don't know where you're going, you won't get there.
- S AGFD would be supportive if you'd look outside the fish box for additional funding to lessen the impact on existing sampling.
- S Response - a budget that varies from 400,000 to ____? A good starting point. Can you estimate how much more would be needed?

Barbara said she would like to go through the plan ([Attachment 14](#)) and address some of the concerns at the same time. They currently don't have a collective database of all the historic data to give them long-term trends in the mainstem or in the tributaries. Among the researchers, there is disagreement over what information that data will provide. Some of the work that was done during GCES was aimed at the EIS which was experimental in determining life history, characteristics around native fish and not necessarily intended for long-term monitoring or trend data. The nature of GCES in both phases was to collect data and prepare a report but not necessarily analyze the data thoroughly. In looking at some of the events likely to take place with fisheries work, long-term monitoring for physical resources or habitats will start in January 2001. Because they don't have a very good idea of the fish database, they might not be able to provide this component with some very good sites that they need some critical habitat information about. If a LSSF occurs this year and/or subsequent years, they still need to know what parameters can actually be measured. There is an EA for a TCD that needs a monitoring plan attached to it which means that a monitoring plan also needs to be developed prior to Spring 2001. They listened to the comments at the TCD workshop regarding data, methodologies, and current monitoring programs and came up with several options (page 2):

They are recommending the reduction of one mainstem trip in favor of a January over wintering trip, and a September mainstem trip as well as doing an LCR effort of three, 10-12 day trips. In terms of cost savings, they are moving costs from one mainstem trip into a data analysis effort. They might be able to take funds from other sources and have taken additional funding out of in-house research. If the GCMRC were to move this effort in-house, this would be an appropriate source of funding for this effort. At the same time other programs would not be affected by this approach. Also, by internalizing this for a brief period of time (a year), they could probably get more buy-in from the Federal agencies as well as private consultants. Again, the baseline monitoring they would do this year would cover over wintering survivorship of previous years' cohort, efforts in the LCR would measure spawning and recruitment success. The timing of those would be April and May, as well as July so that you get an idea of the recruitment in the LCR prior to monsoon season. The objective of the September trip would be to determine relative abundance of all fish in the mainstem.

Barbara said the Protocol Evaluation for the aquatic ecosystem is scheduled for this fall. They propose to have a draft monitoring plan by September, send it out for review, and then implement in January 2001. They propose spending January 2001 through the field season

testing the draft monitoring plan, finalizing it during the field season of 2001, and issuing an RFP in the summer of 2001 for long-term monitoring for fish.

Budget Update - Stephen said he and Bruce Taubert had a discussion concerning the budget in terms of expenditures vs. obligations. Bruce had asked how he could best engage the questions he has rather than taking up AMWG time. Stephen said the solution he offered was that the AMWG could charge the Budget Ad Hoc Group to continue to interface with Reclamation and the GCMRC relative to the issues of budget execution. A suggestion was made that the group would need to be reconstituted as that was not the original intent of the Budget Ad Hoc Group. Bruce said he would ask for more discussion of this subject in April after the other members have had a chance to review the documents a little more.

Next Meeting:

Tuesday, April 4, 9:30 a.m. - 4 p.m.

Wednesday, April 5, 8 a.m. - 12 noon

Possible Agenda Items:

1. Approval/Final of the Goals and MOs
2. Update on KAS
3. Long-term Monitoring Plan
4. Status of Hydrology and pending LSSF
5. Response to the Downstream Report
6. Automatic Generation Control issue

Upcoming Meetings:

Thursday, July 6

Friday, July 7

Possible Agenda Items:

Approval of the 2002 budget (at least bottom line)

Public Comment & Wrapup

None

Adjourned: 11:35 a.m.

General Key to Adaptive Management Program Acronyms

ADWR - Arizona Department of Water Resources
AF - Acre Feet
AGFD - Arizona Game & Fish Department
AGU - American Geophysical Union
AM - Adaptive Management
AMP - Adaptive Management Program
AMWG - Glen Canyon Adaptive Management Work Group (a FACA committee)
AOP - Annual Operating Plan
BA - Biological Assessment
BE - Biological Evaluation
BHBF - Beach/Habitat-Building Flow
BHMF - Beach/Habitat Maintenance Flow
BHTF - Beach/Habitat Test Flow
BIA - Bureau of Indian Affairs
BO - Biological Opinion
BOR - Bureau of Reclamation
CAPA - Central Arizona Project Assn.
cfs - cubic feet per second
CRBC - Colorado River Board of California
CRCN - Colorado River Commission of Nevada
CREDA - Colorado River Energy Distributors Assn.
CRSP - Colorado River Storage Project
CWCB - Colorado Water Conservation Board
DBMS - Data Base Management System
DOI - Department of the Interior
EA - Environmental Assessment
EIS - Final Environmental Impact Statement
ESA - Endangered Species Act
FACA - Federal Advisory Committee Act
FEIS - Final Environmental Impact Statement
FRN - Federal Register Notice
FWS - United States Fish & Wildlife Service
FY - Fiscal Year (Oct 1 to Sept 30 each year)
GCD - Glen Canyon Dam
GCMRC - Grand Canyon Monitoring and Research Center
GCNP - Grand Canyon National Park
GCNRA - Glen Canyon National Recreation Area
GCPA - Grand Canyon Protection Act
HBC - Humpback Chub (endangered native fish)
HMF - Habitat Maintenance Flow
HPP - Historic Preservation Plan
IEDA - Irrigation and Electrical Districts

Association of Arizona
IN - Information Need (stakeholder)
IT - Information Technology (GCMRC program)
KAS - Kanab ambersnail (endangered native snail)
KAWG - Kanab Ambersnail Work Group
LCR - Little Colorado River
LCRMCP: Little Colorado River Multi-Species Conservation Program
LSSF – Low Steady Summer Flows
MAF - Million Acre Feet
MA - Management Action
MO - Management Objective
NAAO - Native American Affairs Office
NAU - Northern Arizona University (Flagstaff, AZ)
NEPA - National Environmental Policy Act
NGS - National Geodetic Survey
NHPA - National Historical Preservation Act
NPS - National Park Service
NRC - National Research Council
NWS - National Weather Service
O&M - Operations & Maintenance (USBR funding)
PA - Programmatic Agreement
PEP - Protocol Evaluation Panel
Powerplant Capacity - 31,000 cfs
Reclamation - United States Bureau of Reclamation
RFP - Request For Proposals
RPA - Reasonable and Prudent Alternative
SAB - Science Advisory Board
Secretary(ies) - Secretary of the Interior
SWCA - Steven W. Carothers Associates
TCD - Temperature Control Device (for Glen Canyon Dam water releases)
TCP - Traditional Cultural Property
TES - Threatened and Endangered Species
TWG - Glen Canyon Technical Work Group (a subcommittee of the AMWG)
UCR - Upper Colorado Region (of the USBR)
UCRC - Upper Colorado River Commission
UDWR - Utah Division of Water Resources
USBR - United States Bureau of Reclamation
USFWS - United States Fish & Wildlife Service
USGS - United States Geological Survey
WAPA - Western Area Power Administration
WY - Water Year (a calendar year)

